WHAT IS CLAIMED IS:

1. A method for encoding a data transmission of user data provided from a source, comprising:

(a) measuring a communications channel to determine available time slots (time) and available bandwidth (frequency);

(b) determining puncturing and shortening information from the available time slots and the available bandwidth, wherein puncturing information includes a number of bits p to be punctured and an identity of bits to be punctured and shortening information and shortening information includes a number of bits s to be shortened and an identity of bits to be shortened;

(c) receiving a K-bit data word at an encoder from the user data source;

(d) shortening the K-bit data word by s bits prior to encoding to form a (K-s)-bit data word;

(e) retaining the s shortened bits for later transmission;

(f) encoding the (K-s)-bit data word into an (N-s)-bit code word, wherein N>K and N-(K-s) is a number of parity bits; and

(g) performing puncturing operations on the (N-s)-bit code word to form an (N-s-p)-bit code word with (K-s) data bits, wherein puncturing is performed on a first dimension and shortening is performed on a second dimension.

2. The method of claim 1, wherein the first dimension is time and the second dimension is frequency.

3. The method of claim 1, wherein the first dimension is frequency and the second dimension is time.

4. The method of claim 1, wherein puncturing information is determined based on the available time slots and shortening is based on the available bandwidth.

5. The method of claim 1, wherein puncturing information is determined based on the available bandwidth and shortening is based on the available time slots.

6. The method of claim 1, wherein measuring a communications channel occurs in real-time.

7. The method of claim 1, further comprising modulating the (N-s-p)-bit code word for transmission over the communications channel at a rate of (N-s)/t bits per second.

8. The method of claim 1, wherein performing the puncturing and shortening operations results in the (N-s-p)-bit code word having a rate *R(s,p)*

$$R(s,p)=\frac{K-s}{N-s-p},\quad 0\le s<K,\quad 0\le p\le N-K$$

that satisfies the relationship $\frac{1}{N}\le R(s,p)\le 1$.

9. A method for decoding a data transmission, comprising:

(a) measuring a communications channel to determine available time slots and available bandwidth;

(b) determining puncturing and shortening information from the available time slots and the available bandwidth, wherein puncturing information includes a number of bits p to be inversely punctured and an identity of bits to be inversely punctured, and shortening information includes a number of bits s to be inversely shortened and an identity of bits to be inversely shortened;

(c) receiving at a receiver a data stream of code words, each in accordance with an (N-s-p)-bit code;

(d) demodulating each (N-s-p)-bit code word from the data stream;

(e) decoding each (N-s-p)-bit code word into a (K-s)-bit data word;

(f) receiving a multiplicity of (K-s)-bit data words sufficient to decode a full set of K-bit data words representative of a user source data contained in the data stream.

10. The method of claim 9, wherein the first dimension is time and the second dimension is frequency.

11. The method of claim 9, the first dimension is frequency and the second dimension is time.

12. The method of claim 9, wherein puncturing information is determined based on the available time slots and shortening is based on the available bandwidth.

13. The method of claim 9, wherein puncturing information is determined based on the available bandwidth and shortening is based on the available time slots.

14. The method of claim 9, wherein measuring a communications channel occurs in real-time.

15. The method of claim 9, wherein the code word is received at a demodulator at a rate of (N-s)/t bits per second and demodulated to a rate of N/t.

16. The method of claim 9, further comprising sending the data word to a user data sink.

17. The method of claim 9, wherein decoding further comprises correcting errors using N-(K-s) parity bits.